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10/656,186	09/08/2003	Woo-Shik Kim	030681-570	8408
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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Office Action Summary	Application No. 10/656,186	Applicant(s) KIM ET AL.	
	Examiner Allen Wong	Art Unit 2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16, 18-41 and 43-52 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16, 18-41 and 43-52 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/24/07 has been entered.

Response to Arguments

2. Applicant's arguments with respect to claims 1-16, 18-41 and 43-52 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 21-25, 46-50 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ngai (6,263,023) in view of Mine (US 2002/0122481).

Regarding claim 21, Ngai discloses an apparatus for image decoding, the apparatus comprising:

a picture header decoding unit which decodes picture header information comprising information required to decode encoded slices of an image divided into a plurality of regions, wherein at least one of the encoded image slices corresponds to each region of the image (col.5, ln.27-43; Ngai discloses the use of a slice address allocator where encoded slice data parameter information is kept and coordinated, used for decoding image information, where slice addresses, high level symbol data that represent encoded parameters such as size, position, structures of picture information are utilized and tracked; thus, picture headers decoding unit is utilized; col.4, ln.28-32 and ln.45-51, Ngai discloses that plural slices, in that each slice represent a region or section of the image frame, are decoded accordingly);

a slice construction unit which determines the structures and positions of the encoded image slices to be decoded according to the decoded picture header information (col.4, ln.28-32 and ln.45-51, Ngai discloses that the decoded picture slices from slice decoders 16 are sent to the stream slicer and then the decoded data are then sent to synchronizer 20 for preparation of assembling or constructing the plural slices based on the obtained header data, symbols or encoded parameters, as disclosed in col.5, ln.35-39 for determining the structure and positioning of the slices' data, for reassembling the image frame data);

a slice decoding unit which decodes the encoded image slices according to the decoded picture header information (col.4, ln.28-32, fig.1 elements 16 are slice decoders for decoding slices based on the decoded header picture information as disclosed in col.5, ln.35-39); and

an image construction unit which disposes image data of each decoded slice according to the determined structure and position of the slices and restores and outputs a decoded image (col.4, ln.28-32 and ln.45-51, Ngai discloses that the decoded picture slices from slice decoders 16 are sent to the stream slicer and then the decoded data are then sent to synchronizer 20 for preparation of reassembling or reconstructing the plural slices into frame data based on the obtained header data, symbols or encoded parameters, as disclosed in col.5, ln.35-39, and in col.4, ln.51-55, the reconstructed image data of the decoded image data is outputted for display for the desired viewing format).

Ngai does not specifically disclose wherein a plurality of the encoded image slices corresponds to a redundantly encoded region of the image. However, Mine teaches that there are encoded image slices that corresponds to the redundantly encoded region of the image (paragraph 0098, Mine discloses that the importance or redundancy of the macroblock data from slices are determined for determining whether certain macroblock data from certain slice data corresponds to the data from "notice region" or important data, or "not a noticed region", ie. redundant image data, and if the macroblock data from the slice belongs to "not a noticed region" or redundantly encoded image region, then the data is given a low importance to signify the redundantly encoded region of the image). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mine into the system of Ngai for efficiently encode image data without degrading image quality (paragraph 0012).

Regarding claims 22 and 47, wherein the slice decoding unit comprises:

an entropy-decoding portion which entropy-decodes the encoded image slices according to the position and size information of the slices decoded from the picture header information (col.4, ln.56-62 and fig.2, element 44 is the entropy decoder); an inverse-transform quantization portion which performs inverse-quantization of the entropy-decoded image slices, performs inverse-transform of the inversely-quantized image data into a temporal domain, and generates temporal/spatial predictively-encoded image data (col.4, ln.63-65 and fig.2, element 48 is the IDCT for inversely discrete transform the image data as inversely quantized by element 46); and an image restoration portion which restores the image by compensating the temporal/spatial predictively-encoded image data (col.4, ln.65 to col.5, ln.5 and fig.2, element 54 is the adder that reconstructs and combine the image data from element 76 as outputted by the motion compensated section 52 and the decoded difference data 72 as outputted from element 48 to generate the temporal/spatial predictively encoded image data).

Regarding claims 23 and 48, wherein, when the decoded picture header information for an encoded image slice indicates that the encoded image slice corresponds to encoded regions of the image (col.5, ln.27-43; Ngai discloses the use of a slice address allocator where encoded slice data parameter information is kept and coordinated, used for decoding image information, where slice addresses, high level symbol data that represent encoded parameters such as size, position, structures of picture information are utilized and tracked; thus, picture headers decoding unit is utilized; col.4, ln.28-32 and ln.45-51, Ngai discloses that plural slices, in that each slice represent a region or section of the image frame, are decoded accordingly), the slice

decoding unit decodes the encoded image slice (col.4, ln.28-32, fig.1 elements 16 are slice decoders for decoding slices based on the decoded header picture information as disclosed in col.5, ln.35-39).

Ngai do not specifically disclose redundantly-encoded regions of image data. However, Mine teaches that there are encoded image slices that corresponds to the redundantly encoded region of the image (paragraph 0098, Mine discloses that the importance or redundancy of the macroblock data from slices are determined for determining whether certain macroblock data from certain slice data corresponds to the data from "notice region" or important data, or "not a noticed region", ie. redundant image data, and if the macroblock data from the slice belongs to "not a noticed region" or redundantly encoded image region, then the data is given a low importance to signify the redundantly encoded region of the image). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mine into the system of Ngai for efficiently encode image data without degrading image quality (paragraph 0012).

Regarding claims 24 and 49, wherein, when errors occur in decoding an encoded image slice, the image construction unit constructs the decoded image using the image data decoded from another one of the plurality of encoded image slices (col.4, ln.28-32 and ln.45-51, Ngai discloses that the decoded picture slices from slice decoders 16 are sent to the stream slicer and then the decoded data are then sent to synchronizer 20 for preparation of reassembling or reconstructing the plural slices into frame data based on the obtained header data, symbols or encoded parameters, as disclosed in col.5, ln.35-

39, and in col.4, ln.51-55, the reconstructed image data of the decoded image data is outputted for display for the desired viewing format).

Ngai do not specifically disclose redundantly-encoded regions of image data. However, Mine teaches that there are encoded image slices that corresponds to the redundantly encoded region of the image (paragraph 0098, Mine discloses that the importance or redundancy of the macroblock data from slices are determined for determining whether certain macroblock data from certain slice data corresponds to the data from "notice region" or important data, or "not a noticed region", ie. redundant image data, and if the macroblock data from the slice belongs to "not a noticed region" or redundantly encoded image region, then the data is given a low importance to signify the redundantly encoded region of the image). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mine into the system of Ngai for efficiently encode image data without degrading image quality (paragraph 0012).

Regarding claims 25 and 50, wherein, when errors do not occur when decoding the plurality of encoded image slices, the image construction unit constructs the decoded image using the image data decoded from one of the encoded image slices (col.4, ln.28-32 and ln.45-51, Ngai discloses that the decoded picture slices from slice decoders 16 are sent to the stream slicer and then the decoded data are then sent to synchronizer 20 for preparation of reassembling or reconstructing the plural slices into frame data based on the obtained header data, symbols or encoded parameters, as

disclosed in col.5, ln.35-39, and in col.4, ln.51-55, the reconstructed image data of the decoded image data is outputted for display for the desired viewing format).

Ngai does not specifically disclose the redundantly-encoded region which was encoded with a smallest quantization interval. However, Mine teaches the redundantly-encoded region which was encoded with a smallest quantization interval (paragraph 0098, Mine discloses that if the macroblock data from the slice belongs to "not a noticed region" or redundantly encoded image region, then the data is given a low importance to signify the redundantly encoded region of the image, and that the quantization value is determined based on the determination of whether the image data is in the "noticed region" or "not a noticed region", and that if the data is in the "not a noticed region", then the data is quantized with the smallest quantization interval).

Regarding claim 46, Ngai discloses a method for redundant image decoding, the method comprising:

(a) decoding picture header information including information required to decode encoded slices of an image divided into a plurality of regions, wherein at least one of the encoded image slices corresponds to each region of the image (col.5, ln.27-43; Ngai discloses the use of a slice address allocator where encoded slice data parameter information is kept and coordinated, used for decoding image information, where slice addresses, high level symbol data that represent encoded parameters such as size, position, structures of picture information are utilized and tracked; thus, picture headers decoding unit is utilized; col.4, ln.28-32 and ln.45-51, Ngai discloses that plural slices, in

that each slice represent a region or section of the image frame, are decoded accordingly);

(b) determining structures and positions of the encoded slices to be decoded according to the decoded picture header information (col.4, ln.28-32 and ln.45-51, Ngai discloses that the decoded picture slices from slice decoders 16 are sent to the stream slicer and then the decoded data are then sent to synchronizer 20 for preparation of assembling or constructing the plural slices based on the obtained header data, symbols or encoded parameters, as disclosed in col.5, ln.35-39 for determining the structure and positioning of the slices' data, for reassembling the image frame data);

(c) decoding the encoded image slices according to the decoded picture header information (col.4, ln.28-32, fig.1 elements 16 are slice decoders for decoding slices based on the decoded header picture information as disclosed in col.5, ln.35-39); and

(d) disposing image data of each decoded slice according to the structure and position of the slices determined in (b) and restoring and outputting a decoded image (col.4, ln.28-32 and ln.45-51, Ngai discloses that the decoded picture slices from slice decoders 16 are sent to the stream slicer and then the decoded data are then sent to synchronizer 20 for preparation of reassembling or reconstructing the plural slices into frame data based on the obtained header data, symbols or encoded parameters, as disclosed in col.5, ln.35-39, and in col.4, ln.51-55, the reconstructed image data of the decoded image data is outputted for display for the desired viewing format).

Ngai does not specifically disclose wherein a plurality of the encoded image slices corresponds to a redundantly encoded region of the image. However, Mine

teaches that there are encoded image slices that corresponds to the redundantly encoded region of the image (paragraph 0098, Mine discloses that the importance or redundancy of the macroblock data from slices are determined for determining whether certain macroblock data from certain slice data corresponds to the data from "notice region" or important data, or "not a noticed region", ie. redundant image data, and if the macroblock data from the slice belongs to "not a noticed region" or redundantly encoded image region, then the data is given a low importance to signify the redundantly encoded region of the image). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mine into the system of Ngai for efficiently encode image data without degrading image quality (Mine paragraph 0012).

Regarding claim 52, Ngai discloses a computer readable medium encoded with a computer program comprising computer-executable instructions for executing the method for image decoding of claim 46 (see above analysis of claim 46 and col.3, ln.66 to col.4, ln.3 where a computer can be used to implement the image decoding). Ngai does not specifically disclose redundant image decoding. However, Mine teaches the use of redundant image decoding (paragraph 0098, Mine discloses that the importance or redundancy of the macroblock data from slices are determined for determining whether certain macroblock data from certain slice data corresponds to the data from "notice region" or important data, or "not a noticed region", ie. redundant image data, and if the macroblock data from the slice belongs to "not a noticed region" or redundantly encoded image region, then the data is given a low importance to signify the redundantly encoded region of the image). Therefore, it would have been obvious

to one of ordinary skill in the art to combine the teachings of Mine into the system of Ngai for efficiently encode image data without degrading image quality (Mine paragraph 0012).

Claims 1-16, 18-20, 26-41, 43-45 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Borgwardt (5,949,490) and Ngai (6,263,023) in view of Mine (US 2002/0122481).

Regarding claims 1, 26 and 51, Borgwardt discloses a computer readable medium encoded with a computer program comprising computer-executable instructions for executing the method of image encoding, a method and an apparatus for image encoding, the apparatus comprising:

a slice modeling unit which divides image data of an image into a plurality of regions and determines a structure for each of a plurality of slices to be used in encoding the regions of the image (col.4, ln.12-23, Borgwardt discloses that the slices are modeled and sent to client processors for analysis to determine the structure of slices to be used in encoding the sections or regions of the image, whereby a slice can be considered a section or region of the image, col.4, ln.24-37, the plural slices are encoded until all of the slices are encoded, and that when each slice is completely encoded, the statistics are obtained to determine the structure of the slices of a picture in a group of pictures GOP; col.4, ln.53-57); and

a slice allocation unit which allocates each region of the image to at least one of the slices according to the slice structures, wherein the slice allocation unit allocates

each of the regions to more than one of the slices (col.4, ln.2-12 and in fig.6, Borgwardt discloses the plural slice of each region of the frame is allocated based on the complexity and to determine the proper encoding rate; col.4, ln.12-23, Borgwardt discloses that the slices are modeled and sent to client processors for analysis to determine the structure of slices to be used in encoding the sections or regions of the image, whereby a slice can be considered a section or region of the image, and that a target encoding rate is determined for determining the allocation of bits for encoding each slice from a plural slices).

Borgwardt does not specifically disclose a picture header encoding unit which encodes picture header information comprising information required to decode encoded slices of the image. However, Ngai teaches a picture header decoding unit which decodes picture header information comprising information required to decode encoded slices of an image divided into a plurality of regions, wherein at least one of the encoded image slices corresponds to each region of the image (col.5, ln.27-43; Ngai discloses the use of a slice address allocator where encoded slice data parameter information is kept and coordinated, used for decoding image information, where slice addresses, high level symbol data that represent encoded parameters such as size, position, structures of picture information are utilized and tracked; thus, picture headers decoding unit is utilized; col.4, ln.28-32 and ln.45-51, Ngai discloses that plural slices, in that each slice represent a region or section of the image frame, are decoded accordingly). The use of a picture header encoding unit is well known in the art of MPEG encoding since a picture is defined as a plurality of slices, where headers are typically used to define

picture information data for informing the decoder or the reception terminal as to how to properly decode image data for viewing. Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Borgwardt and Ngai, as a whole, for producing an accurate, efficient, robust image decoder for producing high quality video images for viewing (Ngai col.3, ln.13-22).

Borgwardt does not specifically disclose and a slice encoding unit which encodes the allocated image regions into encoded slices according to the picture header information. However, Ngai teaches the use of a high definition television decoder that decodes the plurality of slices and generating picture information (col.5, ln.27-43; Ngai discloses the use of a slice address allocator where encoded slice data parameter information is kept and coordinated, used for decoding image information, and see fig.1, note multiple slice decoders 16, thus, picture headers encoding unit is utilized). The use of a slice encoding unit is well known in the art of MPEG encoding since a picture is defined as a plurality of slices, wherein the use of decoders must have encoders for encoding picture information data so as to informing the decoder or the reception terminal as to how to properly decode image data for viewing for outputting video image data. Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Borgwardt and Ngai, as a whole, for producing an accurate, efficient, robust image decoder for producing high quality video images for viewing (Ngai col.3, ln.13-22).

Borgwardt and Ngai do not specifically disclose determines which of the regions are to be redundantly encoded, and "redundantly encoded". However, Mine teaches

that there are encoded image slices that corresponds to the redundantly encoded region of the image (paragraph 0098, Mine discloses that the importance or redundancy of the macroblock data from slices are determined for determining whether certain macroblock data from certain slice data corresponds to the data from "notice region" or important data, or "not a noticed region", ie. redundant image data, and if the macroblock data from the slice belongs to "not a noticed region" or redundantly encoded image region, then the data is given a low importance to signify the redundantly encoded region of the image). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mine into the combination of Borgwardt and Ngai, as a whole, for efficiently encode image data without degrading image quality (Mine paragraph 0012).

Regarding claims 2 and 27, Borgwardt discloses wherein the slice modeling unit determines that each slice structure comprises a series of macroblocks (col.4, ln.12-23; a slice is known to comprise a plurality of macroblocks, wherein Borgwardt discloses that the slices are modeled and sent to client processors for analysis to determine the structure of slices to be used in encoding the sections or regions of the image, whereby a slice can be considered a section or region of the image, col.4, ln.24-37, the plural slices are encoded until all of the slices are encoded, and that when each slice is completely encoded, the statistics are obtained to determine the structure of the slices of a picture in a group of pictures GOP).

Regarding claims 3 and 28, Borgwardt discloses wherein the slice modeling unit divides the image into at least one rectangular first region and a second region and

determines the structures of the slices so that each of the first and second regions is included in at least one independent slice (col.4, ln.12-23, Borgwardt discloses that the slices are modeled and sent to client processors for analysis to determine the structure of slices to be used in encoding the sections or regions of the image, whereby a slice can be considered a section or region of the image, col.4, ln.24-37, the plural slices are encoded until all of the slices are encoded, and that when each slice is completely encoded, the statistics are obtained to determine the structure of the slices of a picture in a group of pictures GOP, and that each slice is a known to be a rectangular array of a group of macroblocks, in that each slice can be considered a section or rectangular region).

Regarding claims 4 and 29, Borgwardt discloses wherein the slice modeling unit determines that each slice structure comprises a set of macroblocks at certain positions of the image (col.4, ln.12-23; a slice is known to comprise a plurality of macroblocks, wherein Borgwardt discloses that the slices are modeled and sent to client processors for analysis to determine the structure of slices to be used in encoding the sections or regions of the image, whereby a slice can be considered a section or region of the image in that each slice is defined as a group of macroblocks in that each macroblock has a location or position within the image).

Regarding claims 5 and 30, Borgwardt and Ngai do not specifically disclose wherein the slice modeling unit determines the structures of the slices in which the image data will be encoded to be identical structures. However, Mine teaches that there are encoded image slices that corresponds to the redundantly encoded region of

the image (paragraph 0098, Mine discloses that the importance or redundancy of the macroblock data from slices are determined for determining whether certain macroblock data from certain slice data corresponds to the data from "notice region" or important data, or "not a noticed region", ie. redundant image data, and if the macroblock data from the slice belongs to "not a noticed region" or redundantly encoded image region, then the data is given a low importance to signify the redundantly encoded region of the image). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mine into the combination of Borgwardt and Ngai, as a whole, for efficiently encode image data without degrading image quality (Mine paragraph 0012).

Regarding claims 6 and 31, Borgwardt and Ngai do not specifically disclose wherein the slice modeling unit determines the structures of the slices in which the image data will be encoded to be non-identical structures. However, Mine teaches that there are encoded image slices that corresponds to the redundantly encoded region of the image (paragraph 0098, Mine discloses that the importance or redundancy of the macroblock data from slices are determined for determining whether certain macroblock data from certain slice data corresponds to the data from "notice region" or important data, or "not a noticed region", ie. redundant image data, and if the macroblock data from the slice belongs to "not a noticed region" or redundantly encoded image region, then the data is given a low importance to signify the redundantly encoded region of the image). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mine into the combination of Borgwardt and Ngai, as a whole,

for efficiently encode image data without degrading image quality (Mine paragraph 0012).

Regarding claims 7 and 32, Borgwardt and Ngai do not specifically disclose wherein the slice modeling unit determines the regions to be redundantly encoded based on regions predetermined by a user as being important regions from the image. However, Mine teaches that there are encoded image slices that corresponds to the redundantly encoded region of the image (paragraph 0098, Mine discloses that the importance or redundancy of the macroblock data from slices are determined for determining whether certain macroblock data from certain slice data corresponds to the data from "notice region" or important data, or "not a noticed region", ie. redundant image data, and if the macroblock data from the slice belongs to "not a noticed region" or redundantly encoded image region, then the data is given a low importance to signify the redundantly encoded region of the image). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mine into the combination of Borgwardt and Ngai, as a whole, for efficiently encode image data without degrading image quality (Mine paragraph 0012).

Regarding claims 8 and 33, Borgwardt and Ngai do not specifically disclose wherein the slice modeling unit determines the regions to be redundantly encoded by detecting regions where motions are actively performed, from the image. However, Mine teaches that there are encoded image slices that corresponds to the redundantly encoded region of the image (paragraph 0098, Mine discloses that the importance or redundancy of the macroblock data from slices are determined for determining whether

certain macroblock data from certain slice data corresponds to the data from "notice region" or important data, or "not a noticed region", ie. redundant image data, and if the macroblock data from the slice belongs to "not a noticed region" or redundantly encoded image region, then the data is given a low importance to signify the redundantly encoded region of the image). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mine into the combination of Borgwardt and Ngai, as a whole, for efficiently encode image data without degrading image quality (Mine paragraph 0012).

Regarding claims 9 and 34, Borgwardt and Ngai do not specifically disclose wherein the slice modeling unit determines an amount of the regions to be redundantly encoded according to an error rate and a transmission bandwidth which occur in a transmission environment of the encoded slices, and an encoding efficiency of the slice encoding unit. However, Mine teaches that there are encoded image slices that corresponds to the redundantly encoded region of the image (paragraph 0098, Mine discloses that the importance or redundancy of the macroblock data from slices are determined for determining whether certain macroblock data from certain slice data corresponds to the data from "notice region" or important data *where motion is determined*, or "not a noticed region", ie. *redundant* image data, and if the macroblock data from the slice belongs to "not a noticed region" or redundantly encoded image region, then the data is given a low importance to signify the *redundantly* encoded region of the image). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mine into the combination of Borgwardt and Ngai, as

a whole, for efficiently encode image data without degrading image quality (Mine paragraph 0012).

Regarding claims 10 and 35, Borgwardt discloses wherein the slice modeling unit comprises: a slice structure modeling portion which determines the structures of the plurality of slices to be used for image encoding (col.4, ln.12-23, Borgwardt discloses that the slices are modeled and sent to client processors for analysis to determine the structure of slices to be used in encoding the sections or regions of the image, whereby a slice can be considered a section or region of the image, col.4, ln.24-37, the plural slices are encoded until all of the slices are encoded, and that when each slice is completely encoded, the statistics are obtained to determine the structure of the slices of a picture in a group of pictures GOP).

Borgwardt and Ngai do not specifically disclose a redundant encoding modeling portion which determines positions and amount of the regions to be redundantly encoded from the image using the plurality of slices. However, Mine teaches that there are encoded image slices that corresponds to the redundantly encoded region of the image (paragraph 0098, Mine discloses that the importance or redundancy of the macroblock data from slices are determined for determining whether certain macroblock data from certain slice data corresponds to the data from "notice region" or important data, or "not a noticed region", ie. redundant image data, and if the macroblock data from the slice belongs to "not a noticed region" or redundantly encoded image region, then the data is given a low importance to signify the redundantly encoded region of the image). Therefore, it would have been obvious to one of ordinary skill in the art to

combine the teachings of Mine into the combination of Borgwardt and Ngai, as a whole, for efficiently encode image data without degrading image quality (Mine paragraph 0012).

Regarding claims 11 and 36, Borgwardt discloses wherein the slice allocation unit determines sizes of the plurality of slices according to an amount of the regions (col.4, ln.2-12 and in fig.6, Borgwardt discloses the plural slice of each region of the frame is allocated based on the complexity and to determine the proper encoding rate; col.4, ln.12-23, Borgwardt discloses that the slices are modeled and sent to client processors for analysis to determine the structure of slices to be used in encoding the sections or regions of the image, whereby a slice can be considered a section or region of the image, and that a target encoding rate is determined for determining the allocation of bits for encoding each slice from a plural slices).

Borgwardt and Ngai do not specifically disclose "redundantly encoded". However, Mine teaches that there are encoded image slices that corresponds to the redundantly encoded region of the image (paragraph 0098, Mine discloses that the importance or redundancy of the macroblock data from slices are determined for determining whether certain macroblock data from certain slice data corresponds to the data from "notice region" or important data, or "not a noticed region", ie. redundant image data, and if the macroblock data from the slice belongs to "not a noticed region" or redundantly encoded image region, then the data is given a low importance to signify the redundantly encoded region of the image). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mine into the combination

of Borgwardt and Ngai, as a whole, for efficiently encode image data without degrading image quality (Mine paragraph 0012).

Regarding claims 12 and 37, Borgwardt discloses wherein the slice allocation unit allocates the image data to the plurality of slices (col.4, ln.2-12 and in fig.6, Borgwardt discloses the plural slice of each region of the frame is allocated based on the complexity and to determine the proper encoding rate; col.4, ln.12-23, Borgwardt discloses that the slices are modeled and sent to client processors for analysis to determine the structure of slices to be used in encoding the sections or regions of the image, whereby a slice can be considered a section or region of the image, and that a target encoding rate is determined for determining the allocation of bits for encoding each slice from a plural slices).

Borgwardt and Ngai do not specifically disclose image data of the regions to be redundantly encoded and image data of regions not to be redundantly encoded. However, Mine teaches that there are encoded image slices that corresponds to the redundantly encoded region of the image (paragraph 0098, Mine discloses that the importance or redundancy of the macroblock data from slices are determined for determining whether certain macroblock data from certain slice data corresponds to the data from "notice region" or important data, or "not a noticed region", ie. redundant image data, and if the macroblock data from the slice belongs to "not a noticed region" or redundantly encoded image region, then the data is given a low importance to signify the redundantly encoded region of the image). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mine into the combination

of Borgwardt and Ngai, as a whole, for efficiently encode image data without degrading image quality (Mine paragraph 0012).

Regarding claims 13 and 38, Borgwardt discloses wherein the slice allocation unit allocates the image data to the plurality of slices so that at least one slice includes image data of only a region to be encoded (col.4, ln.2-12 and in fig.6, Borgwardt discloses the plural slice of each region of the frame is allocated based on the complexity and to determine the proper encoding rate; col.4, ln.12-23, Borgwardt discloses that the slices are modeled and sent to client processors for analysis to determine the structure of slices to be used in encoding the sections or regions of the image, whereby a slice can be considered a section or region of the image, and that a target encoding rate is determined for determining the allocation of bits for encoding each slice from a plural slices).

Borgwardt and Ngai do not specifically disclose region to be redundantly encoded. However, Mine teaches that there are encoded image slices that corresponds to the redundantly encoded region of the image (paragraph 0098, Mine discloses that the importance or redundancy of the macroblock data from slices are determined for determining whether certain macroblock data from certain slice data corresponds to the data from "notice region" or important data, or "not a noticed region", ie. redundant image data, and if the macroblock data from the slice belongs to "not a noticed region" or redundantly encoded image region, then the data is given a low importance to signify the redundantly encoded region of the image). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mine into the combination

of Borgwardt and Ngai, as a whole, for efficiently encode image data without degrading image quality (Mine paragraph 0012).

Regarding claims 14 and 39, Borgwardt does not specifically disclose wherein the picture header encoding unit encodes the picture header information containing structure, position, and size of each slice. However, Ngai teaches a picture header decoding unit which decodes picture header information comprising information required to decode encoded slices of an image divided into a plurality of regions, wherein at least one of the encoded image slices corresponds to each region of the image (col.5, ln.27-43; Ngai discloses the use of a slice address allocator where encoded slice data parameter information is kept and coordinated, used for decoding image information, where slice addresses, high level symbol data that represent encoded parameters such as size, position, structures of picture information are utilized and tracked; thus, picture headers decoding unit is utilized; col.4, ln.28-32 and ln.45-51, Ngai discloses that plural slices, in that each slice represent a region or section of the image frame, are decoded accordingly). The use of a picture header encoding unit is well known in the art of MPEG encoding since a picture is defined as a plurality of slices, where headers are typically used to define picture information data for informing the decoder or the reception terminal as to how to properly decode image data for viewing. Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Borgwardt and Ngai, as a whole, for producing an accurate, efficient, robust image decoder for producing high quality video images for viewing (Ngai col.3, ln.13-22).

Regarding claims 15 and 40, Borgwardt does not specifically disclose wherein the slice encoding unit comprises: a slice header encoding portion which generates for each of the slices a slice header comprising information used to encode macroblocks of the slice according to the picture header information; a temporal/spatial predictive encoding portion which temporal/spatial predictively encodes the allocated image regions into the encoded slices of the image; a transform quantization portion which transforms the temporal/spatial predictively-encoded data slices into a frequency domain and quantizes the data of the transformed slices; and an entropy-encoding portion which entropy-encodes the quantized data.

However, Ngai teaches a picture header decoding unit which decodes picture header information comprising information required to decode encoded slices of an image divided into a plurality of regions, wherein at least one of the encoded image slices corresponds to each region of the image (col.5, ln.27-43; Ngai discloses the use of a slice address allocator where encoded slice data parameter information is kept and coordinated, used for decoding image information, where slice addresses, high level symbol data that represent encoded parameters such as size, position, structures of picture information are utilized and tracked; thus, picture headers decoding unit is utilized; col.4, ln.28-32 and ln.45-51, Ngai discloses that plural slices, in that each slice represent a region or section of the image frame, are decoded accordingly), a temporal/spatial predictive decoding section (col.4, ln.28-32, fig.1 elements 16 are slice decoders for decoding slices based on the decoded header picture information as disclosed in col.5, ln.35-39), a transform quantization portion (col.4, ln.63-65 and fig.2,

element 48 is the IDCT for inversely discrete transform the image data as inversely quantized by element 46), and an entropy decoding portion (col.4, ln.56-62 and fig.2, element 44 is the entropy decoder).

The use of a picture header encoding unit is well known in the art of MPEG encoding since a picture is defined as a plurality of slices, where headers are typically used to define picture information data for informing the decoder or the reception terminal as to how to properly decode image data for viewing. The use of a slice encoding unit, a temporal/spatial predictive encoding portion, entropy encoding, transform-quantization portion are well known in the art of MPEG encoding since a picture is defined as a plurality of slices, wherein the use of decoders must have encoders for encoding picture information data so as to informing the decoder or the reception terminal as to how to properly decode image data for viewing for outputting video image data. Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Borgwardt and Ngai, as a whole, for producing an accurate, efficient, robust image decoder for producing high quality video images for viewing (Ngai col.3, ln.13-22).

Regarding claims 16 and 41, Borgwardt do not specifically disclose wherein the slice header includes flag information which indicates whether the slice to be encoded. However, Ngai teaches a picture header decoding unit which decodes picture header information comprising information required to decode encoded slices of an image divided into a plurality of regions, wherein at least one of the encoded image slices corresponds to each region of the image (col.5, ln.27-43; Ngai discloses the use of a

slice address allocator where encoded slice data parameter information is kept and coordinated, used for decoding image information, where slice addresses, high level symbol data that represent encoded parameters such as size, position, structures of picture information are utilized and tracked; thus, picture headers decoding unit is utilized; col.4, ln.28-32 and ln.45-51, Ngai discloses that plural slices, in that each slice represent a region or section of the image frame, are decoded accordingly). The use of a picture header encoding unit is well known in the art of MPEG encoding since a picture is defined as a plurality of slices, where headers are typically used to define picture information data for informing the decoder or the reception terminal as to how to properly decode image data for viewing. Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Borgwardt and Ngai, as a whole, for producing an accurate, efficient, robust image decoder for producing high quality video images for viewing (Ngai col.3, ln.13-22).

Borgwardt and Ngai do not specifically disclose region to be redundantly encoded. However, Mine teaches that there are encoded image slices that corresponds to the redundantly encoded region of the image (paragraph 0098, Mine discloses that the importance or redundancy of the macroblock data from slices are determined for determining whether certain macroblock data from certain slice data corresponds to the data from "notice region" or important data, or "not a noticed region", ie. redundant image data, and if the macroblock data from the slice belongs to "not a noticed region" or redundantly encoded image region, then the data is given a low importance to signify the redundantly encoded region of the image). Therefore, it would have been obvious

to one of ordinary skill in the art to combine the teachings of Mine into the combination of Borgwardt and Ngai, as a whole, for efficiently encode image data without degrading image quality (Mine paragraph 0012).

Regarding claims 18 and 43, Borgwardt and Ngai do not specifically disclose wherein the slice encoding unit quantizes each of the redundantly-encoded slices at different quantization intervals. However, Mine teaches the image data comprising slices are quantized each of the redundantly-encoded slices at different quantization intervals (paragraph 0098, Mine discloses that if the macroblock data from the slice belongs to "not a noticed region" or redundantly encoded image region, then the data is given a low importance to signify the redundantly encoded region of the image, and that the quantization value is determined based on the determination of whether the image data is in the "noticed region" or "not a noticed region", and that if the data is in the "not a noticed region", then the data is quantized with the smallest quantization interval, if the image data is in the "noticed region", that the data is quantized with higher quantization interval, etc.). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mine into the combination of Borgwardt and Ngai, as a whole, for efficiently encode image data without degrading image quality (Mine paragraph 0012).

Regarding claims 19 and 44, Borgwardt and Ngai do not specifically disclose wherein the slice encoding unit encodes only main information containing a macroblock header and a motion vector of the regions to be redundantly encoded in a first slice and encodes all information of the regions to be redundantly encoded in a second slice

among two slices including the image data of the region to be redundantly encoded. However, Mine teaches that there are encoded image slices that corresponds to the redundantly encoded region of the image (paragraph 0098, Mine discloses that the importance or redundancy of the macroblock data from slices are determined for determining whether certain macroblock data from certain slice data corresponds to the data from "notice region" or important data, or "not a noticed region", ie. redundant image data, and if the macroblock data from the slice belongs to "not a noticed region" or redundantly encoded image region, then the data is given a low importance to signify the redundantly encoded region of the image, further, the macroblock data contains the macroblock header data as suggested in paragraph 0065, and that motion vector data is considered, as suggested in paragraph 0069, when checking to see if there is any temporal/spatial activity within the image to be redundantly encoded). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mine into the combination of Borgwardt and Ngai, as a whole, for efficiently encode image data without degrading image quality (Mine paragraph 0012).

Regarding claims 20 and 45, Borgwardt and Ngai do not specifically disclose wherein the slice encoding unit encodes only main information containing a macroblock header, a motion vector, and a discrete cosine (DC) coefficient contained in a discrete cosine transform (DCT) coefficient of the regions to be redundantly encoded in a first slice and encodes all information of the regions to be redundantly encoded in a second slice among two slices including the image data of the regions to be redundantly encoded. However, Mine teaches that there are encoded image slices that corresponds

to the redundantly encoded region of the image (paragraph 0098, Mine discloses that the importance or redundancy of the macroblock data from slices are determined for determining whether certain macroblock data from certain slice data corresponds to the data from "notice region" or important data, or "not a noticed region", ie. redundant image data, and if the macroblock data from the slice belongs to "not a noticed region" or redundantly encoded image region, then the data is given a low importance to signify the redundantly encoded region of the image, further, the macroblock data contains the macroblock header data as suggested in paragraph 0065, and that motion vector data is considered when checking to see if there is any temporal/spatial activity within the image to be redundantly encoded as suggested in paragraph 0069, and that in paragraph 0071, the discrete cosine coefficient information is considered). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mine into the combination of Borgwardt and Ngai, as a whole, for efficiently encode image data without degrading image quality (Mine paragraph 0012).

Contact Information

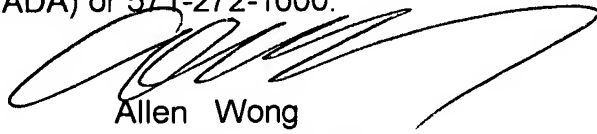
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen Wong whose telephone number is (571) 272-7341. The examiner can normally be reached on Mondays to Thursdays from 8am-6pm Flextime.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John W. Miller can be reached on (571) 272-7353. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Primary Examiner
Art Unit 2621

AW
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